

NON-PUBLIC?: N  
ACCESSION #: 8806020181  
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Salem Generating Station - Unit 2 PAGE: 1 of 4

DOCKET NUMBER: 05000311

TITLE: Rx. Trip During Startup Due To Electro-Hydraulic Control Equipment Problems

EVENT DATE: 04/22/88 LER #: 88-007-00 REPORT DATE: 05/20/88

OPERATING MODE: 1 POWER LEVEL: 018

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION 50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: M. J. Pollack - LER Coordinator TELEPHONE #: 609-339-4022

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT: On April 22, 1988 at 1418 hours, a Turbine Trip occurred as a result of No. 23 Steam Generator (S/G) High-High Level (67%). Following the Turbine Trip, a Reactor Trip occurred due to the plant being above 10% power (permissive P-7). A review of the event revealed that just prior to the Turbine Trip reactor power increased from approximately 12% to 18%. This power increase apparently caused level in No. 23 S/G to increase (swell) rapidly peaking at approximately 67%. The apparent cause of this event has been attributed to Electro-Hydraulic Control (EHC) equipment problems. The EHC Rate Amplifier Card was replaced and the EHC was successfully tested. Operations Management has reviewed this event. Discussions with the individuals involved have been completed. Operating Department procedures will be reviewed to ensure appropriate guidance is provided for EHC operation. Engineering investigations of the EHC control concerns during plant startup are continuing. A License Change Request (No. 87-09) has been submitted to the NRC modifying the logic for a Reactor Trip subsequent to a Turbine Trip. Presently, a Turbine Trip/Reactor Trip will occur when reactor power is greater than or equal to 10% (P-7). The change will require a Turbine Trip/Reactor Trip to occur when reactor power is greater than or equal to 50% (P-9).

(End of Abstract)

TEXT: PAGE: 2 of 4

#### PLANT AND SYSTEM IDENTIFICATION:

Westinghouse - Pressurized Water Reactor

Energy Industry Identification System (EIIS) codes are identified in the text as (XX)

#### IDENTIFICATION OF OCCURRENCE:

Reactor Trip During Reactor Start-Up Due To Electro-Hydraulic Control Equipment Problems

Event Date: 04/22/88

Report Date: 05/20/88

This report was initiated by Incident Report No. 88-150.

#### CONDITIONS PRIOR TO OCCURRENCE:

Mode 1 Reactor Power 18% - Unit Load 140 MWe

#### DESCRIPTION OF OCCURRENCE:

On April 22, 1988 at 1418 hours, a Turbine Trip occurred as a result of No. 23 Steam Generator (S/G) High-High Level (67%). Following the Turbine Trip, a Reactor Trip occurred due to the plant being above 10% power (permissive P-7).

The Unit was stabilized in Mode 3 (Hot Standby). At 1430 hours the same day, in accordance with the requirements of the Code of Federal Regulations 10CFR 50.72(b)(2)(ii), the Nuclear Regulatory Commission was notified of the automatic actuation of the Reactor Protection System (JC).

A review of the event revealed that just prior to the Turbine Trip reactor power increased from approximately 12% to 18%. This power increase apparently caused level in No. 23 S/G to increase (swell) rapidly peaking at approximately 67%.

#### APPARENT CAUSE OF OCCURRENCE:

The apparent cause of this event has been attributed to Electro-Hydraulic Control (EHC) (JJ) equipment problems.

Routine reactor startup procedure involves using the automatic control features of the EHC circuitry. However, during the startup on April 22, 1988, when the Unit was synchronized with the grid, turbine load remained at zero instead of automatically loading to 50 MWe. Additionally, the "EHC Setter" and "EHC Reference" indications did not immediately stabilize.

Approximately thirty (30) seconds after synchronization, power began to indicate and the "EHC Setter" and "EHC Reference" indications

TEXT: PAGE: 3 of 4

#### APPARENT CAUSE OF OCCURRENCE: (cont'd)

stabilized. With load at approximately 40 MWe, the board Nuclear Control Operator (NCO) set the EHC Setter to 20% (with IMP Out) and a ramp rate to 10%/minute. Due to the concern for the potential of motorizing the generator, the board NCO chose the 10% ramp rate. The board NCO then pushed the "EHC GO" button and load increased as the governor valves opened. With the load at approximately 140 MWe No. 23 S/G level swelled resulting in the Turbine Trip. The other three (3) S/Gs did not swell noticeably.

Typically, after Unit synchronization with the grid, load is increased from 50 MWe to approximately 150 MWe in a short time in order to help stabilize S/G level control and to put sufficient load on the Main Generator to protect against motorizing. At the time of the trip, No. 23 S/G was the last S/G to have been fed (i.e., Main Feedwater).

Investigation of the EHC Controls did not reveal a cause for not picking up load immediately upon synchronization nor for the prolonged unstable EHC Setter and Reference indications. However, based upon analysis of the EHC Controls problem(s), the most likely cause was the Rate Amplifier Card, which was replaced.

#### ANALYSIS OF OCCURRENCE:

The turbine trip on Steam Generator high-high level is an anticipatory trip to prevent moisture carryover from the Steam Generator and damage to the main turbine due to excessive moisture carryover. The purpose of the reactor trip is to reduce the primary plant transient resulting from the loss of the turbine above 10% power. A turbine trip above 10% power results in a direct reactor trip and a controlled short term release of steam to the condenser via the steam dump. This steam

release removes sensible heat from the reactor coolant system and precludes Steam Generator safety valve operation.

The Reactor Trip after a Turbine Trip with the Unit above 10% power is anticipatory and is included as part of good engineering practice and prudent design. No credit is taken in any of the safety analysis for this trip. For rapid transients during power operation, protection of the reactor is provided by the power range detectors. For slower developing transients, protection of the reactor is provided by overtemperature and overpower delta temperature bistables. Since this trip was from less than full power (18%), the thermal and hydraulic transients were significantly less than those imposed by a full power trip.

This occurrence involved no undue risk to the health and safety of the public. However, because of the automatic actuation of the reactor protection system, the event is reportable in accordance with the Code of Federal Regulations 10CFR 50.73 (a)(2)(iv).

#### CORRECTIVE ACTION:

The EHC Rate Amplifier Card was replaced (reference the Apparent

TEXT: PAGE: 4 of 4

#### CORRECTIVE ACTION: (cont'd)

Cause of Occurrence Section). Subsequently, the EHC was successfully tested.

Operations Management has reviewed this event. Discussions with the individuals involved have been completed.

Operating Department procedures will be reviewed to ensure appropriate guidance is provided for EHC operation including ramp rate limitations.

Engineering investigations of the EHC control concerns during plant startup are continuing.

A License Change Request (No. 87-09) has been submitted to the Nuclear Regulatory Commission (NRC) modifying the logic for a Reactor Trip subsequent to a Turbine Trip. Presently, a Turbine Trip/Reactor Trip will occur when reactor power is greater than or equal to 10% (P-7). The change will require a Turbine Trip/Reactor Trip to occur when reactor power is greater than or equal to 50% (P-9). Upon NRC

approval of the License Change Request, a design change to modify the Turbine Trip/Reactor Trip circuitry will be prepared.

/s/ J. M. ZUPKO, JR.  
General Manager -  
Salem Operations  
MJP:pc  
SORC Mtg. 88-046

ATTACHMENT # 1 TO ANO # 8806020181 PAGE: 1 OF 1

PSE&G  
Public Service Electric and Gas Company P.O. Box E Hancocks Bridge, New  
Jersey 08038

Salem Generating Station  
May 20, 1988

U. S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, DC 20555

Dear Sir:

SALEM GENERATING STATION  
LICENSE NO. DPR-75  
DOCKET NO. 50-311  
UNIT NO. 2  
LICENSEE EVENT REPORT 88-007-00

This Licensee Event Report is being submitted pursuant to the requirements of Nuclear Regulatory Commission requirements 10CFR 50.73(a)(2)(iv). This report is required within thirty days of discovery.

Sincerely yours,  
/s/ J. M. ZUPKO, JR.  
J. M. Zupko, Jr.  
General Manager-  
Salem Operations  
MJP:pc  
Distribution

\*\*\* END OF DOCUMENT \*\*\*

---